

REMARKS

The pending application is finally rejected. Entry of the amendments set forth above and reconsideration of the application is proper because the amendments set forth above place the claims in a condition for allowance or, at a minimum, place the application in a better form for appeal.

Claims 1, 3-8, 11-22, 24-26, and 28-38 are pending and active in the application. By amendment above, Claim 1 has been amended to recite that in step (b) the recessed microstructures are at least partially filled during the first period of time. Claim 1 has also been amended to recite that the second time period is greater than or equal to ten seconds. Claim 1 has also been amended to replace the term "ameliorate" with the term limit in step (c). Claim 6 has been canceled in view of the amendment to Claim 1. Claim 7 has been amended to change its dependence from Claim 6 to Claim 3 in view of the cancellation of Claim 6.

Claims 24, 25, 26, and 28 have been amended in a manner similar to that described above regarding Claim 1.

Support for the "at least partially" amendment to Claims 1, 24, 25, 26, and 28 is provided by the specification at page 15, line 14. Support for the amendment regarding "ten" seconds is provided by the specification at page 14, line 32. Support for the amendment regarding changing the term "ameliorate" to "limit" is provided by the specification at page 13, line 33.

Claims 1, 3-8, 11-15, 22, 24-26, 28-31, and 33-37 are rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent No. 5,972,192, to Dubin et al. in view of U.S. Patent No. 6,245,676, to Ueno. For the following reasons, applicants respectfully traverse this rejection.

To establish a *prima facie* obviousness of a claimed invention, it is well understood that all claim limitations must be taught or suggested by the prior art. For the following reasons,

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applicants assert that the combination of Dubin et al. in view of Ueno does not disclose or suggest each of the limitations of independent Claims 1, 24, 25, 26, and 28 for the following reasons.

Independent Claim 1 and independent Claim 24 each recite the use of reverse electroplating power during a second period of time to limit deposition of (1) an overburden of metal ions (Claim 1) or (2) further metal ions (Claim 24) over the at least partially filled recessed microstructures. Thus, the process of independent Claims 1 and 24 limit deposition of metal ions that leads to the development of an overburden of metal over recessed microstructures. See specification at page 8, lines 34 and 35.

Ueno is relied upon in the Examiner's Action to provide teaching that is missing from Dubin et al., namely the limitation that was added in the prior response relating to the second time period being greater than or equal to five seconds. When the combined teachings of Dubin et al. and Ueno are considered, they do not teach the limitation regarding limiting the deposition of an overburden or limiting the deposition of further metal ions over the at least partially filled recessed microstructures.

As noted in Ueno at Col. 8, lines 25-32, referring to Figures 1A-C and 2A, after trenches 14-1 to 14-n are filled, plating continues in order to purposefully produce an overburden above the filled trenches 14-1 through 14-n. According to Ueno, the formation of this overburden is desirable to avoid the undesirable dishing of the surface of the interlayer insulating film 12 illustrated in Figure 10 and described at Col. 3, lines 31-44. Thus, Ueno teaches that it is desirable, not undesirable, to form an overburden over recessed microstructures. Ueno does not teach or suggest a process for depositing metal structures on a surface of a workpiece wherein steps are taken to limit the deposition of an overburden of metal ions over recessed microstructures.

Accordingly, applicants assert that the subject matter of independent Claim 1 and independent Claim 24 and the claims that depend therefrom are nonobvious over Dubin et al. in view of Ueno.

Independent Claims 25 and 26 recite that reverse plating power pulses during a second time period are used to limit the deposition of further metal ions over recessed microstructures.

As discussed above with respect to independent Claim 1 and independent Claim 24, the combination of Dubin et al. and Ueno does not teach or suggest a process for depositing a metal structure on a surface of a workpiece that employs reverse plating power pulses during a second time period to limit the deposition of metal ions over recessed microstructures. The combination of Dubin et al. and Ueno teach just the opposite, by encouraging the formation of an overburden of metal through the deposition of further metal ions over the recessed microstructures. For these foregoing reasons, the subject matter of independent Claims 25 and 26 and the claims dependent therefrom is novel and nonobvious over the combination of Dubin et al. and Ueno.

Independent Claim 28 recites a controller that controls a power supply during a second time period to supply a level of reverse electroplating power to limit the deposition of further metal ions over recessed microstructures that have been at least partially filled. For the reasons given above with respect to Claims 1, 24, 25, and 26, the combination of Dubin et al. and Ueno does not teach an electroplating apparatus that includes a controller for controlling a power supply in this manner. Accordingly, the subject matter of independent Claim 28 and the claims dependent therefrom is novel and nonobvious over the combination of Dubin et al. in view of Ueno.

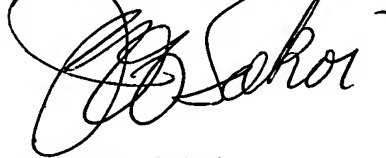
For the foregoing reasons, the subject matter of the pending claims is novel and nonobvious over the applied references. Applicants respectfully request withdrawal of the outstanding rejections and allowance of the application. If the reviewing party has any questions

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regarding the above, he is invited to call applicants' attorney at the number listed below so that any outstanding issues can be resolved in a timely and efficient manner.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first-class mail with postage thereon fully prepaid and addressed to Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

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